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Multitasking Industrial Robot

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Abstract : **A Robot is a re-programmable multifunctional manipulator designed to move materials, parts, tools or specialized devices through variable programmed motions for the performance of a variety of tasks. Robot exactly is a system that contains sensors, control systems, manipulators, power supplies and software all working together to perform a task. A robot is a combination of physics, mechanical engineering, electrical engineering, structural engineering, mathematics and computing. The Inventory control industrial robot perform various kind of mechanical operation such as metal removing process, pick and place robot is a microcontroller based mechatronic system that detects the object, picks that object from source location and places at desired location.**

I. INTRODUCTION

In the world of advance engineering, life of human beings should be simpler hence to make Life simpler and convenient, we have made “Inventory control industrial robot". A model of controlling unwanted motion and also increase the efficiency of the work to help industrial plants. This model uses sensor technology with microcontroller to make a smart mechanical device.

The model play the versatile mechanical operations such as metal removing process, pick and place

Robot is a microcontroller based mechatronic system that detects the object, picks that object from source location and places at desired location.

The **industrial robot** can be considered to be a general purpose reprogrammable machine tool, moving an end effectors, which either holds components or a tool. ... Depending on the type of **robot** and the application, the mechanical structure of a **robot** can be divided into two parts, the main manipulator and a wrist assembly.

The functions of a robot are best summarized by considering the following definition of the industrial robot:

An Industrial Robot is a reprogrammable device designed to both manipulate and transport parts, tools, or specialized manufacturing implements through programmed motions for the performance of specific manufacturing tasks.

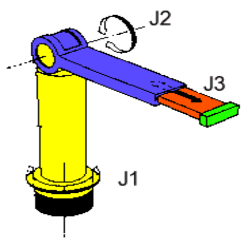
For the purpose of this course a robot is considered to be a specific application of a manipulator. A manipulator is a system with a number of joints and links that can be controlled (either position or speed) within three dimensional spaces.

Depending on the type of robot and the application, the mechanical structure of a robot can be divided into two parts, the main manipulator and a wrist assembly. The manipulator will position the end effectors while the wrist will control its orientation.

The work envelope is the space that can be reached by the end of the robot arm. All interaction between the robot, and other machines, parts and processes must take place within the work envelope.

The structure of the robot consists of a number of links and joints, a joint will allow relative motion between two links. Two types of joints are used, a revolute joint to produce rotation and a linear prismatic joint. To achieve complete control of the end effectors position and orientation a minimum of six joints are required. The basic robot arm has three joints, this allows the tool at the end of the arm to be positioned anywhere in the robots working envelope. Even though there are a large number of robot configurations that are possible, only five configurations are commonly used in industrial robotics:

Polar



Observation

The selection of a robot is a significant problem to the design engineer and depends on the task to be performed. One of the earliest applications was to operate in the foundry, the environment being considered to be a hazard to a human operator, due to the noise, heat and fumes from the process. This is the classic type of application where a robot is used to replace workers because of the hazards.

Other reasons include repetitive work cycles, difficult or hazardous materials to be moved, and the requirements for multi-shift operation. The robots that have been installed in manufacturing industry are normally employed in one of four application groups; material handling, process operations, assembly and inspection. To control a robot so that it is capable of performing the required task, all the joints need to be accurately controlled.

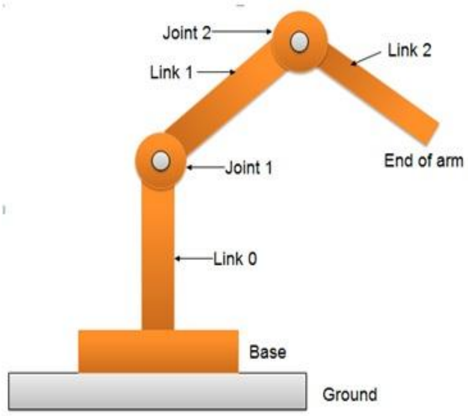
1. The work volume depends on the actual joint limits of motion.
2. A rotary motion is normally quicker that the equivalent linear motion. However to achieve linear motion using rotary joints, a co-ordinated move is required.
3. Not all robotic applications require 6 axes, for example paint spraying, this requires a five axis robot as spraying is symmetrical about the roll axis

Robot anatomy and related attributes:

Joints and Links

The manipulator of an industrial robot consists of a series of joints and links. Robot anatomy deals with the study of different joints and links and other aspects of the manipulator's physical construction. A robotic joint provides relative motion between two links of the robot. Each joint, or axis, provides a certain degree-of-freedom (dof) of motion. In most of the cases, only one degree-of-freedom is associated with each joint. Therefore the robot's complexity can be classified according to the total number of degrees-of-freedom they possess.

Each joint is connected to two links, an input link and an output link. Joint provides controlled relative movement between the input link and output link. A robotic link is the rigid component of the robot manipulator. Most of the robots are mounted upon a stationary base, such as the floor. From this base, a joint-link numbering scheme may be recognized as shown in Figure. The robotic base and its connection to the first joint are termed as link-0. The first joint in the sequence is joint-1. Link-0 is the input link for joint-1, while the output link from joint-1 is link-1—which leads to joint-2. Thus link 1 is, simultaneously, the output link for joint-1 and the input link for joint-2. This joint-link-numbering scheme is further followed for all joints and links in the robotic systems.



Drive systems

Basically three types of drive systems are commonly used to actuate robotic joints. These are electric, hydraulic, and pneumatic drives. Electric motors are the prime movers in robots. Servo-motors or steeper motors are widely used in robotics. Hydraulic and pneumatic systems such as piston-cylinder systems, rotary vane actuators are used to accomplish linear motions, and rotary motions of joints respectively.

Pneumatic drive is regularly used for smaller, simpler robotic applications; whereas electric and hydraulic drives may be found applications on more sophisticated industrial robots. Due to the advancement in electric motor technology made in recent years, electric drives are generally favored in commercial applications. They also have compatibility to computing systems. Hydraulic systems, although not as flexible as electrical drives, are generally used where larger speeds are required. They are generally employed to carry out heavy duty operations using robots.

The combination of drive system, sensors, and feedback control system determines the dynamic response characteristics of the manipulator. Speed in robotic terms refers to the absolute velocity of the manipulator at its end-of-arm. It can be programmed into the work cycle so that different portions of the cycle are carried out at different velocities. Acceleration and deceleration control are also important factors, especially in a confined work envelope. The robot's ability to control the switching between velocities is a key determinant of the manipulator's capabilities. Other key determinants are the weight (mass) of the object being manipulated, and the precision that is required to locate and position the object correctly. All of these determinants are gathered under the term 'speed of response', which is defined as the time required for the manipulator to move from one point in space to the next. Speed of response influences the robot's cycle time, which in turn affects the production rate that can be achieved.

Stability refers to the amount of overshoot and oscillation that occurs in the robot motion at the end-of-arm as it attempts to move to the next programmed location. More oscillations in the robotic motion lead to less stability in the robotic manipulator. However, greater stability may produce a robotic system with slower response times.

II. CONCLUSION

Just like the industrial revolution, automation and robotics are the next upgrade to the industrial revolution. People mistake automation for eliminating manual labor. But automation is not something that can work on its own, without the involvement of humans. Automation is something that enhances humans to increase the productivity by accomplishing routine tasks in lesser cycle time, without the interference of human labor. Moreover automation is a job shifter rather than a job killer. As engineers, it is mandatory for us to learn the upcoming technology involved in automation.

This report has introduced the concept of a system in which industrial robots were applied to picking work, medium payload handling work, assembly work, etc. In addition, robots work long hours and handle heavy objects without getting tired or making mistakes, leading to improved quality.

Robotics and automation will offer great benefits to humanity in the future. Robotics and automation enables great advantage for co le to do works in a short period. Defending the country, creating new machines, operating with robots. Therefore, the technology is developing rapidly and people should benefit from technology's opportunities.

III. REFERENCES

[1]. **Handbook of robotics**, Eds. Siciliano, Bruno and Khatib, Oussama. Springer, 2008.

[2]. Almond, R. G., Graphical Belief Modeling.

[3]. Angeles, J. Fundamentals of Robotic Mechanical Systems: Theory, Methods, and Algorithms.

[4]. Asada, H. and Slotine, J.-J. E. Robot analysis and control.

[5]. Ball, Robert Stawell, Theory of screws: a study in the dynamics of a rigid body, Hodges, Foster and Co., 1876.

[6]. Bar-Shalom, Yaakov and Li, Xiao-Rong. Estimation and Tracking, Principles, Techniques, and Software.

[7]. Bishop, Christopher M., Pattern Recognition and Machine Learning.

[8]. Brady, J. M., Robot motion planning: planning and control.

[9]. Brand, Louis, Vector and tensor analysis, Wiley, 1948.

[10]. Canudas de Wit, C., Siciliano, B. and Bastin, Georges, (Eds.), Theory of Robot Control.

[11]. Craig, J. J. Introduction to Robotics: mechanics and control.

[12]. Crane, C. D. III and Duffy, J., Kinematic Analysis of Robot Manipulators.

[13]. Ginsberg, M. Essentials of Artificial Intelligence.

[14]. Duffy, J. Statics and Kinematics with Applications to Robotics.

[15]. Kanal, L. N. and Lemmer, J. F., (Eds), Uncertainty in Artificial Intelligence.

[16]. Latombe, Jean Claude. Robot motion planning.

[17]. LaValle, Steven M., Planning algorithms. Also available on the web.

[18]. Lewis, F. L. and Abdallah, C. T. and Dawson, D. M. Control of robot manipulators.

[19]. McCarthy, J. M. Introduction to Theoretical Kinematics.

[20]. Murray, R. M, Li, Z. and Sastry, S. S., A Mathematical Introduction to Robotic Manipulation.

[21]. N., ISO/TR 8373 : Manipulating Industrial Robots - Vocabulary, ISO, 1988.

[22]. Nilsson, N., Artificial intelligence: a new synthesis, 1998.

[23]. Paul, R. P. Robot Manipulators: Mathematics, Programming, and Control.

[24]. Pearl, J., Probabilistic reasoning in intelligent systems: networks of plausible inference.

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